Investment Behavior of U.S. Firms over Heterogeneous Capital Goods: A Snapshot

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Abstract

Recent research has indicated that investment in certain capital types, such as computers, has fostered accelerated productivity growth and enabled a fundamental reorganization of the workplace. However, remarkably little is known about the composition of investment at the micro level. This paper takes an important first step in filling this knowledge gap by looking at the newly available micro data from the 1998 Annual Capital Expenditure Survey (ACES), a sample of roughly 30,000 firms drawn from the private, nonfarm economy. The paper establishes a number of stylized facts. Among other things, I find that in contrast to aggregate data the typical firm tends to concentrate its capital expenditures in a very limited number of capital types, though which types are chosen varies greatly from firm to firm. In addition, computers account for a significantly larger share of firms' incremental investment than they do of lumpy investment. [Keywords: Capital Heterogeneity, Investment; JEL Codes D21, D24, D29.]

1 Introduction

Very little is known about firms' disaggregate investment behavior. Economists' priors regarding the composition of investment at the firm level have been based primarily on economy-wide or industry-level capital flows information. These priors are likely to be inaccurate for a couple of reasons.

First, there is no reason to expect the capital flows patterns of individual firms to be similar to those at the aggregate level. This is particularly true in light of the growing body of evidence regarding heterogeneity at the micro level in terms of total-factor productivity, employment, and total investment [Haltiwanger (1997), Davis, et al. (1996), Caballero, et al. (1995)]. Numerous studies have shown that aggregate measures, even up built up from microeconomic data, often mask important variations in the measures at the micro level. For example, aggregate investment is fairly smooth over time despite enormous lumpiness at the micro level [Doms and Dunne (1998), Caballero, et al. (1995)].

The second reason to be skeptical of priors concerning firm behavior based on aggregate capital flows information is that this information, at least in the U.S., is not in fact based on microeconomic source data. The U.S. capital flows tables, constructed by the Bureau of Economic Analysis (BEA), are instead primarily based on occupational employment distributions combined with data on the aggregate supply of asset-specific capital and aggregate investment by industry. Inferring capital flows from occupational employment matrices relies on extremely restrictive conditions that are unlikely to hold in reality.

Both of the above problems were due to a previous lack of data on disaggregate investment at the micro level. This has changed, however, with the full-scale introduction of asset-type detail in the Census Bureau's Annual Capital Expenditures Survey (ACES) in 1998. (This asset-type detail was also collected in the 2003 ACES, which is not yet available). The 1998 ACES micro data is now available (conditional upon approval from the Census Bureau's Center for Economic Studies).

This paper uses the 1998 ACES micro data file to present some of the first evidence on firm-level, cross-sectional patterns regarding capital mix. First, I find substantial differences in investment composition across firms, even within narrowly-defined industries. Second, certain capital types (e.g., Computers, Software, Furniture,

General Purpose Machinery)[1] are shown to be used across a wide range of industries, indicating that they are general purpose capital goods. Third, I find evidence that certain types of capital goods tend to be bundled, i.e., purchased in conjunction with each other. Here, I focus on Computers, given recent work showing computers' importance for productivity growth [e.g., Wilson (2004); Gilchrist, et al. (2004); Brynjolfsson & Hitt (2003); Oliner & Sichel (2000)]. I find that Computers tend to be purchased in conjunction with Software, Scientific Instruments, and Furniture, among other types. Fourth, it is shown that the typical firm tends to concentrate its capital expenditures in a very limited number of capital types. However, which types are chosen varies greatly from firm to firm. Lastly, I find that investment that takes place during lumpy investment episodes, or "spikes", identified at the firm level, has a systematically different composition than that of incremental investment. Specifically, Computers account for a significantly larger share of firms' incremental investment than they do of lumpy investment.

2 Data

2.1 1998 Annual Capital Expenditures Survey

The principal source of data for this paper is the 1998 Annual Capital Expenditures Survey (ACES).[2] The ACES is conducted annually by the U.S. Census Bureau to elicit information on capital expenditures by U.S. private, nonfarm companies. This information is used by the BEA in constructing the National Income and Product Accounts (NIPA).

In typical years, the ACES queries companies on their expenditures on total equipment and total structures, in addition to related values such as book value of capital assets, accumulated depreciation, retirements, etc.. In the 1998 survey, however, the ACES additionally required firms to report their investment broken down by 55 separate types of capital – 26 types of equipment and 29 types of structures. These data on disaggregate investment allow us to observe the complete composition of firms' investment.

[1] Throughout the paper, capital type names are capitalized to indicate that they refer to specific categories of capital listed in the Annual Capital Expenditures Survey.

[2] For more details regarding the 1998 Annual Capital Expenditures Survey, including the published aggregate data and the actual survey questionaires, see Census Bureau (2000).

In fact, the survey requests firms to break out their capital expenditures in this way separately for each of the industries in which they operate. Except in Section 3.4, the analyses in this paper are based on the ACES data as aggregated to the firm-level.

The 1998 ACES sampling frame consists of all U.S. private, nonfarm employers.[3] All companies with 500 or more employees were surveyed while smaller employers were surveyed based on a stratified random sampling such that larger firms were sampled with a higher probability. Response to the ACES is legally required so response rates are extremely high. The final sample consists of nearly 34,000 firms, of which approximately half have 500 or more employees. 27,712 firms in the sample had non-zero investment. Except where otherwise noted, all of the analysis in this paper will be based on this sample of firms with non-zero investment.

The 1998 ACES is unique as the only large-scale micro-level U.S. survey of investment that disaggregates investment into a full range of detailed asset types (i.e., beyond simply total equipment and total structures, and beyond just one or two asset types such as computers or transportation equipment). These rich data on disaggregate investment provide us with a point-in-time snapshot of investment composition choices by a large number of firms spanning the U.S. private nonfarm economy. In the following section, we will analyze the cross-sectional patterns relating to investment composition.

3 Cross-Sectional Patterns of Firm-Level Investment Behavior

In this section, I utilize the 1998 ACES sample, consisting of 27,712 firms, to answer a number of interesting and previously unexplored questions related to disaggregate investment behavior.

3.1 Frequency (or Commonality) of Investment

First, how common (or rare) are certain types of investment among firms? Whether or not a firm decides to invest in a particular capital good can be thought of as the extensive margin of the investment decision. (The intensive margin, how much of

[3] In addition, a sample of companies with zero employees were sent an abbreviated questionaire which did not request the disaggregate investment detail.

the capital good to actually purchase or lease, is analyzed in the next subsection). The last two columns of Table 1 give the proportion of sample firms that report capital expenditures on each capital type. The first of the two columns gives the unconditional proportion; the second column gives the proportion conditional on firms having non-zero investment in the capital type's broad asset class (equipment or structures).

Computers are the most common type of investment, with over 55% of firms purchasing at least some computers (or peripheral equipment). This share jumps to 71% if one excludes firms that have no equipment investment at all. At first blush, it would appear that the propensity to invest in Computers is higher for manufacturing firms: 59% compared to 54.5% for non-manufacturing (not shown). However, this difference is primarily because non-manufacturers are simply less likely to invest in equipment at all (75% of non-manufacturing firms had positive equipment investment compared to 90% of manufacturing firms). Among equipment-buying firms, 72% of non-manufacturers invested in Computers while 66% of manufacturers did so.

It is worth comparing these numbers on computer investment to similar numbers reported by Dunne, Foster, Haltiwanger, and Troske (2002). Dunne, et al. find that the proportion of manufacturing plants in the Annual Survey of Manufacturers (ASM) reporting positive computer investment rose from about 10% in 1977 to just over 60% by 1992. Again, I find the proportion among manufacturing firms in 1998 to be 59%. The Dunne, et al. numbers are likely overestimated, however, since about 40% of sampled ASM plants did not respond to the computer question in the ASM survey. Non-respondents are arguably far more likely to have zero computer investment than the respondents. Thus, the upward trend in the proportion of firms (or plants) investing in computers likely continued between 1992 and 1998.

After computers, the next most common types of investment are Furniture (31%), Office Equipment (24%), Autos (24%), Communications Equipment (21%), Special Industry Machinery (16%), General Purpose Machinery (16%), Office Buildings (15%), Software (14%), and Manufacturing Plants (12%). All other types were invested in by less than 10% of the sample.

3.2 Average Composition

Second, what is the average usage of (or at least expenditure on) each type of capital good, relative to total capital? Table 1 shows the cross-firm, weighted mean of each asset type's share of firm investment. Observations are weighted by sample weight

(inverse of sampling probability, adjusted for nonresponses) which is necessary given the stratification of the ACES sampling design. The third column gives the asset type's mean share of firms' total investment while the fifth column gives the asset type's share of the subaggregate total equipment or total structures. The asset types in the table are sorted by mean share of total investment.

Computers are nearly one-third of total (and equipment) capital expenditures for the average firm, a much higher share than that of any other capital good. Hence, not only are Computers the most *common* type of investment as discussed above, they are also the largest share of investment on average. The next largest type of investment tends to be Autos, which, on average, comprise about one-eighth of firm total (and equipment) investment. Interestingly, the fact that Computers are a much larger average share of investment than Autos is in sharp contrast to the picture one gets from the aggregate data. According to the published aggregate ACES data (and similarly for BEA capital flows data), Autos actually comprised a larger share of economy-wide investment in 1998 than did Computers: 17% of equipment compared to 14% for Computers. This contrast between the aggregate and firm level shares reveals that firms that are large (in terms of total investment) tend to invest more intensively in autos than computers, while the opposite is true for small firms.

Other capital goods that make up at least 5% of the average firm's total investment are Furniture (7.9%); Office Buildings (7.7%); Other Office Equipment (6.2%); Plants (5.2%); and General Purpose Machinery (5.0%).

It should be noted that a small average investment share could arise either from a large number of firms having a small investment share or from a small number of firms having a large investment share (while the rest of firms are near zero). The latter tends to be the case for structures while the former tends to the case for equipment types. For example, "Other Commercial Stores/Buildings, NEC" averages a relatively high 4.5% of total investment (9th most out of the 55 types) even though less than 2% of the sample invested in this type of structure. In contrast, 13.6% of the sample purchased software but software accounted for less than 1% of the average firm's investment.

Part of the reason for the high frequency of software investment coupled with its low average share – lower than software aggregate investment share in the NIPAs – is that the ACES software category is narrower than that of the NIPAs. In the ACES, firms are instructed to report investment in software "only if capitalized as part of a tangible asset" and to exclude it "if the purchase is considered intangible

(e.g., licensing agreement) or if expensed such as office supplies." The NIPAs, on the other hand, classify all software expenditures as investment regardless of whether the firm accounts for the expenditures as capital or intermediate expenses. (Note that software that is bundled with, or embedded in, hardware is not counted as software investment in either ACES or NIPAs.) The fact that Capitalized Software Purchased Separately, on average, comprises a very small share of firms' investment even though a considerable percentage of firms purchase it may be partially because firms purchase this kind of software in conjunction with other kinds of software (including expensed software). Hence, the average investment share for Capitalized Software Purchased Separately is likely well below the average share for total software, while the measured percentage of firms investing in this kind of software is probably near that for total software.

3.3 Identifying Range of Use

The third interesting question that can be answered with these data is: how broadly is each capital good used? A simple statistic that answers this question is the investment concentration ratio by the top four investing industries (at the 3-digit SIC level). Specifically, I compute the fraction of economy-wide investment in a given capital type that is accounted for by the four industries with the highest levels of investment in that type. A low value for this "top-4 concentration ratio" indicates that the capital good is used across a wide range of industries.

Table 2 gives the top-4 concentration ratio for each capital type. The types of equipment found to have the widest range of use are generally those one would intuitively expect to be general purpose: Computers, Other Office Equipment, Software, Fabricated Metal Products, General Purpose Machinery, Autos, and Furniture. Perhaps less intuitive, we also find Metalworking Machinery and Medical Equipment to have widespread use. Interestingly, Communications Equipment does not appear to be used broadly across industries – its top-4 concentration ratio is 87%. Structures, as one might expect, generally have much higher concentration ratios then equipment, reflecting the more specialized functions that structures have. An exception is Manufacturing, Processing, and Assembly Plants, which tend to be purchased by firms in many different industries.

3.4 Analysis of Cross-Sectional Variance

As mentioned in Section 2, the ACES data is actually collected at the level of industry divisions within the firm. Thus, an interesting question that can be answered with this micro data is: how much of the variance in an asset type's share of investment is due to differences across divisions within a firm as opposed to differences across firms? To answer this question, I do the following for each asset type: First, I compute the asset type's share of investment for each firm-division. I then compute the within-firm mean of the investment share across divisions and subtract it from the firm's division-level investment shares. Lastly, I compute the total sample variance of these demeaned investment shares, which yields the within-firm variance, and divide it by the total sample variance of the non-demeaned firm-division level investment shares. The resulting ratio indicates what fraction of the total variance in the asset type's investment share is within-firm versus between-firm. I perform this exercise both conditioning on firms having multiple divisions and unconditionally.

It turns out that very little of the total firm-division-level variance in a capital type's investment share (for any capital type) is within-firm. Conditional on firms having multiple divisions, the ratio of within-firm to total variance ranges across asset types from 0.01 to 0.39. For equipment, the median (and mean) ratio is 0.27; for structures, the median ratio is 0.26 (mean is 0.22). The unconditional ratios are much lower (median is 0.12 for equipment and 0.13 for structures). Thus, a substantial majority of the variance in investment shares is between-firm, suggesting that establishments/divisions within firms tend to be fairly homogenous in terms of their capital composition.

3.5 Bundling of investment: The Case of Computers

Capital goods are not used in isolation. They are often used together as part of a capital infrastructure system. This should be especially true for general purpose capital goods such as computers. Table 3 provides evidence of what capital types tend to be purchased in conjunction with, or instead of, computers. Specifically, for each capital type, we calculate the partial correlation between the computer investment share and that type's investment share, controlling for 3-digit industry effects. Table 3 provides the weighted correlations for those types that have a statistically significant partial correlation with computers. Observations are weighted by sample weight (unweighted

correlations, not shown, are very similar).

Among equipment, Computers tend to be purchased in conjunction with Other Office Equipment; Scientific Instruments; Software; Aerospace Products; Furniture; and Artwork, Books, & Other Equipment, NEC. Capital goods that generally are purchased separately from Computers are Communications Equipment; Metalworking Machinery; Special Industry Machinery; Cars and Light Trucks; Heavy-Duty Trucks; Engine, Turbine, and Power Transmission Equipment; Electrical and Distribution Equipment; Mining and Oil & Gas Field Machinery; and Miscellaneous Equipment.

Among structures, Computers are most often purchased with Office, Bank, & Professional Buildings; Multi-Retail Stores; and Other Commercial Buildings/Stores, NEC. On the other hand, firms with capital expenditures on the following types of structures tend not to purchase Computers in the same year: Industrial Nonbuilding Structures; Automotive Facilities; Air, Land, & Water Transportation Facilities; Telecommunications Facilities; Electric, Nuclear, & Other Power Facilities; Petroleum & Natural Gas Wells; and Other Mining & Well Construction.

3.6 Investment Variety

It is well documented that investment is extremely lumpy over time at the microeconomic level (see, e.g., Doms and Dunne (1998) and Power (1999)). However, we know little about the microeconomic "lumpiness," or concentration, of investment over capital types. The question is: in a given year, do firms tend to invest only in a small number of capital types or do they spread their investment dollars across a wide variety of types?

To answer this question, for each firm I calculated the number of asset types in which the firm reported positive investment. Figures 1a and 1b show the cross-sectional distribution of this number across the firms in our sample. Figure 1a gives the distribution for equipment; Figure 1b gives the distribution for structures. Of the 21,686 firms that reported positive equipment investment, a little less than 30% of investing firms reportedly purchased only one type of equipment. 16% reported investment in two types, 15% in three types, 12% in four types, and 9% in five types. The frequencies decline with the number of reported types (though, for non-disclosure purposes, the tail of the distribution is truncated at 18-23 types). The average equipment-purchasing firm reported investment in 3.4 types of equipment.

As expected, investment in structures tends to be highly concentrated. In fact,

72% of the 10,782 firms that reported positive structures investment invested in just one type of structure. 16% reported investing in two types, almost 7% reported investing in three types, and the frequencies continue to decline thereafter with the number of types. The average number of structure types that firms invested in (conditional on having positive structures investment) was 1.5.

An alternative way to assess how concentrated or diversified firm level investment is to compute the proportion of the sample that invested in three (e.g.) or more capital types (within the broad asset class, equipment or structures). I call this statistic the 3+ equipment (structures) share. For the entire sample (of 27,712 firms), the 3+ equipment share is 42.8% and the 3+ structures share is 4.3%. For the subsample of firms with non-zero equipment investment, the 3+ equipment share is 54.7%; for the subsample of structures-buying firms, the 3+ structures share is 11.1%.

The variety of firms' investments does of course vary by firm size. Table 4 shows, separately for equipment and structures, the mean number of types in which firms invest and the 3+ share. For both equipment and structures, I find that larger firms tend to invest in a larger variety of capital goods. This is not surprising considering that larger firms tend to be more diversified in terms of their business operations and hence more diversified in terms of their physical capital needs.[4]

I also briefly note here that investment variety also varies noticeably by industry. It appears to that quasi-public industries, such as educational services, utilities, pipelines, and water services, and finance industries tend to report investment in the most number of types.

The low number of types that most firms report investing in, especially for structures, in part may reflect inaccuracy on the part of respondents. That is, decomposing their firm's capital expenditures into a large number of disaggregate asset types may impose an exorbitant time and record-keeping burden on respondents. It is difficult to determine with certainty whether respondents truncate the number of asset types for which they report investment, but it may contribute to measurement error in the investment shares.

Nonetheless, the fact that 72% of firms report investment in only a single struc-

[4] As discussed below, there is the possibility that firms with positive but near-zero investment in a type report that investment as zero. This may be more problematic for smaller firms since they are more likely to have near-zero investment and also to have less-developed accounting systems. Thus, part of the correlation between firm size and reported investment variety may be due to misreporting.

ture type, combined with the fact (established in Table 1) that no single structure type comprises more than a quarter of the average firm's investment in structures, suggests that firms tend to concentrate construction investment on a single type of structure but that this type differs from firm to firm.[5] The particular type of investment a firm chooses appears to be primarily determined by the industry to which the firm belongs, as evidenced by the high concentration ratios in Table 2.

3.7 The Composition of Spikes versus Incremental Investment

As mentioned above, it is well known that investment at the micro level takes place in spikes rather than smooth incremental investment. A number of macroeconomic models build on this micro evidence to explain aggregate investment dynamics [e.g., Caballero and Engels (1999)]. It is generally assumed that the investment occuring in spikes and that occuring in increments are of the same qualitative nature. In particular, it is assumed that there is no difference in quality, i.e., the capital-embodied technology, between lumpy and incremental investment. If there is a difference, however, the true (i.e., quality-adjusted) lumpiness of investment could in fact be much different than is currently assumed.

To assess whether the quality composition of investment spikes is fundamentally different from that of incremental investment, I start with the firm-level investment share for each asset type (summarized in Table 1). I then split the sample into firms that engaged in an investment spike in 1998 and those that did not. Lastly, I compute the weighted mean investment share by type for each subsample (weighting by total investment) and perform a two-sample equality of the means t-test. The most common definition of an investment spike used in the literature [Doms and Dunne (1998), Powers (1999)], and thus the definition I use, is the following:

$$\begin{aligned} Spike_{jt} &= 1 \text{ if } I_{jt}/K_{j,t-1} > 0.20, \\ Spike_{jt} &= 0 \text{ otherwise.} \end{aligned}$$

[5] This finding is consistent with the theoretical model of optimal adoption of complementary capital goods by Jovanovic and Stolyarov (2000). They show that given fixed costs of investment, the firm may invest in complementary capital goods asynchronously rather than simultaneously. Thus, the finding that firms tend to concentrate their structures investment, which should involve higher fixed costs than equipment investment, on a single type but that this type differs across firms is consistent with their theory. A test of this theory would require a time dimension to this data: a finding that the concentrated type differs across time within firms would support the theory.

For most types, the mean investment share does not differ meaningfully between the two samples. A notable exception, however, is Computer investment: Computers comprise 14% of incremental investment, on average, whereas Computers comprise just 12% of investment spikes. Note this result is robust to controlling for 3-digit SIC industry (by demeaning investment shares by industry mean prior to computer the group means). Given that Computer investment may in fact embody more technology per dollar than other types of investment (see Wilson (2004) for evidence of this), this finding suggests investment in constant-quality units may actually be less lumpy at the micro level than previously thought.

4 Conclusion

Given recent research establishing the enormous microeconomic heterogeneity in terms of numerous economic variables – e.g., intensity of (total) investment [Doms and Dunne (1998)], employment [Caballero, Engel, and Haltiwanger (1997)], human capital [Abowd, et al. (2004)], and TFP [Haltiwanger (1997)] – it is perhaps not surprising that I find such tremendous heterogeneity in terms of disaggregate investment and investment composition. Most economic models of production or investment assume a single capital stock, or perhaps one for equipment and one for structures. The fact that of what this capital consists varies so greatly across firms strongly suggests that these models may be misspecified, especially in light of recent research showing that the composition of capital is an important factor in production [Cummins & Dey (1998), Jorgenson and Stiroh (2000), Caselli and Wilson (2004), Wilson (2004)]. As our economic models evolve to incorporate the effects of capital composition, a firm understanding of the patterns of disaggregate investment at the micro level will be key. This paper is an important first step in providing that understanding.

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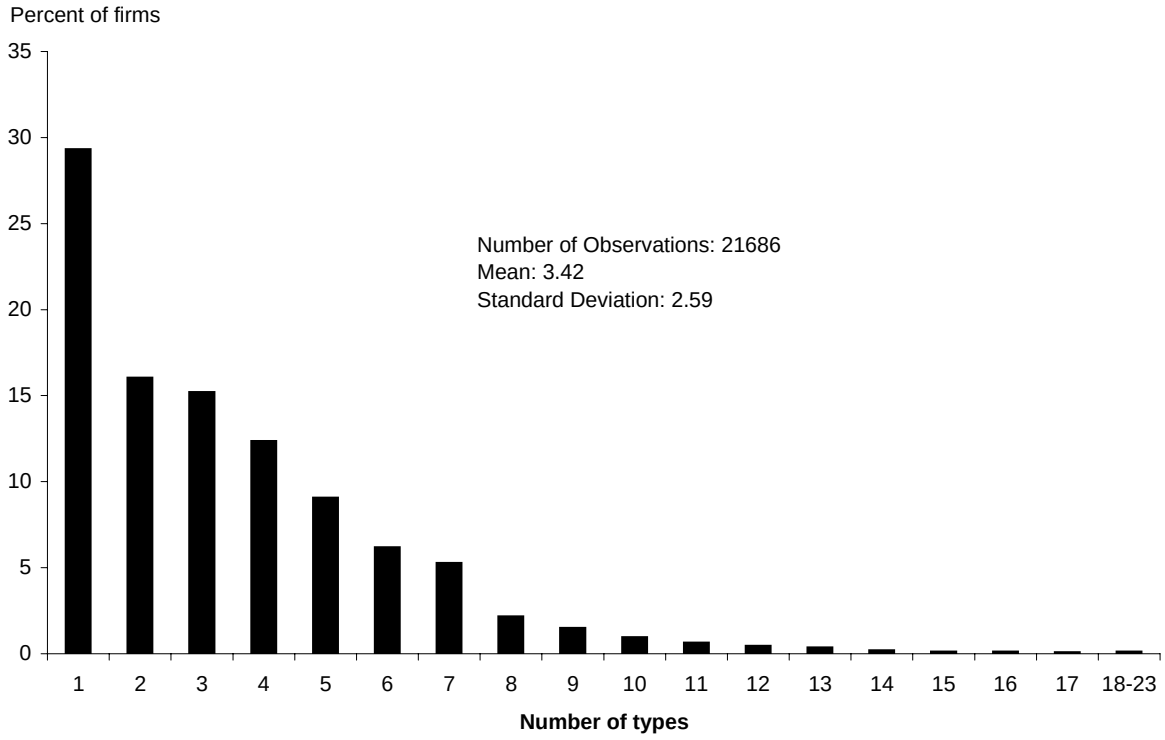
Figure 1

A. Distribution of number of equipment types for which a firm has non-zero investment



B. Distribution of number of structure types for which a firm has non-zero investment

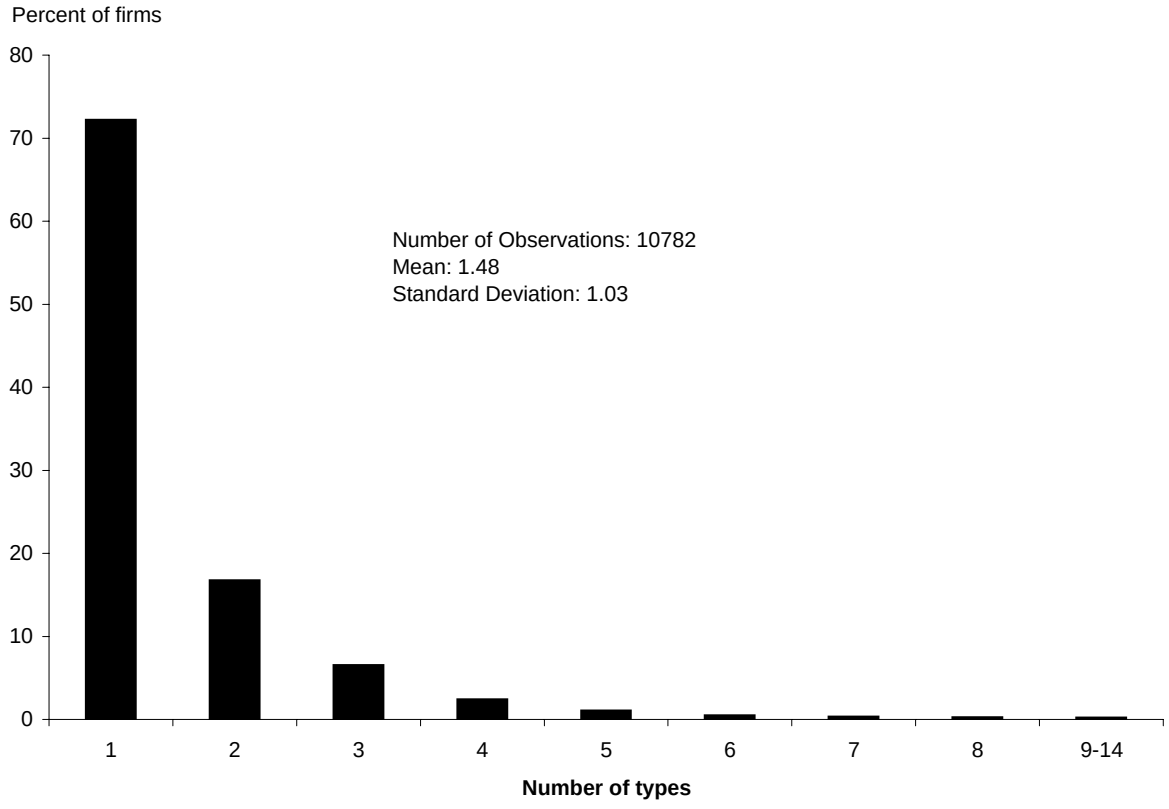


Table 1. Mean investment share and # of firms with positive investment, by capital type

		Share of Total Investment		Share of Broad Asset (Equipment or Structures) Investment		% of sample with positive investment	% of sample (conditional on positive investment at the broad asset level) with positive investment
Type	Description	Weighted Mean	Std. Deviation	Weighted Mean	Std. Deviation		
311	Computer and Peripheral Equipment	0.320	0.416	0.324	0.418	55.4%	70.8%
331	Cars and Light Trucks	0.126	0.303	0.128	0.304	23.9%	30.5%
351	Furniture and Related Products	0.079	0.235	0.082	0.238	30.9%	39.5%
141	Office, Bank, and Professional Buildings	0.077	0.184	0.243	0.418	15.1%	19.3%
312	Office Equipment Except Computers and Peripherals	0.062	0.209	0.063	0.210	24.3%	31.1%
131	Manufacturing, Processing, and Assembly Plants	0.052	0.174	0.163	0.358	12.3%	15.7%
324	General Purpose Machinery[1]	0.051	0.196	0.052	0.198	15.7%	20.0%
152	Stores - Food Related	0.048	0.167	0.108	0.308	3.1%	4.0%
155	Other Commercial Stores/Buildings, NEC	0.045	0.166	0.093	0.287	1.8%	2.2%
323	Special Industrial Machinery	0.045	0.190	0.045	0.192	16.1%	20.6%
315	Medical Equipment and Supplies	0.042	0.192	0.043	0.193	8.0%	10.2%
313	Communications, Audio, and Video Equipment	0.036	0.154	0.037	0.157	21.2%	27.1%
334	Other Transportation Equipment	0.030	0.155	0.030	0.156	7.8%	10.0%
354	Service Industry Equipment	0.030	0.162	0.031	0.165	5.8%	7.5%
154	Warehouses and Distribution Centers (except Passenger)	0.027	0.118	0.074	0.249	4.3%	5.6%
111	Residential Structures	0.027	0.139	0.038	0.182	1.4%	1.8%
332	Heavy Duty Trucks	0.026	0.148	0.026	0.148	5.7%	7.3%
353	Construction Machinery	0.026	0.151	0.026	0.151	3.5%	4.5%
322	Metalworking Machinery	0.024	0.144	0.024	0.145	6.1%	7.8%
151	Automotive Facilities	0.024	0.122	0.051	0.218	1.2%	1.5%
162	Special Care Facilities	0.023	0.117	0.039	0.185	2.4%	3.0%
171	Amusement and Recreational Facilities	0.018	0.102	0.027	0.144	1.1%	1.4%
355	Other Miscellaneous Equipment	0.018	0.122	0.018	0.125	5.3%	6.7%
361	Artwork, Books, and Other Equipment, NEC	0.017	0.118	0.018	0.119	5.8%	7.4%
201	Preschool, Primary/Secondary, and Higher Education Facilities	0.017	0.113	0.022	0.143	0.8%	1.0%
352	Agricultural Equipment	0.014	0.110	0.014	0.111	2.0%	2.5%
121	Hotels, Motels, and Inns	0.012	0.096	0.016	0.125	0.8%	1.0%
153	Multi-Retail Stores	0.010	0.075	0.025	0.151	1.8%	2.3%
343	Electrical Equipment, NEC	0.010	0.095	0.010	0.095	3.0%	3.9%

Table continued on next page…

TABLE 1 (continued)

321	Fabricated Metal Products	0.008	0.082	0.008	0.082	3.9%	9.9%
316	Capitalized Software Purchased Separately	0.008	0.063	0.008	0.064	13.6%	34.9%
314	Navigational, Measuring, Electromedical, and Control Instruments	0.008	0.077	0.008	0.077	3.9%	9.9%
192	Electric, Nuclear, and Other Power Facilities	0.007	0.072	0.009	0.094	1.1%	2.7%
223	Other Non-building Structures, NEC	0.006	0.059	0.018	0.122	1.7%	4.5%
161	Hospitals	0.006	0.055	0.013	0.109	2.7%	6.8%
191	Telecommunication Facilities	0.005	0.057	0.014	0.116	0.6%	1.5%
112	Manufactured (Mobile) Homes	0.005	0.058	0.007	0.070	0.1%	0.2%
142	Medical Offices	0.005	0.048	0.018	0.130	1.8%	4.7%
202	Special School and Other Educational Facilities	0.003	0.046	0.004	0.062	0.3%	0.8%
181	Air, Land, and Water Transportation Facilities	0.002	0.034	0.007	0.079	1.2%	3.1%
344	Mining and Oil and Gas Field Machinery and Equipment	0.002	0.044	0.002	0.045	1.2%	3.2%
212	Petroleum and Natural Gas Wells	0.002	0.033	0.002	0.048	0.3%	0.8%
342	Electrical Transmission and Distribution Equipment	0.001	0.026	0.001	0.027	2.0%	5.1%
222	Highway and Street Structures	0.001	0.024	0.002	0.045	0.4%	1.1%
193	Water Supply, Sewage, and Waste Disposal Facilities	0.001	0.024	0.002	0.035	0.6%	1.5%
333	Aerospace Products and Parts	0.001	0.026	0.001	0.026	1.5%	3.8%
213	Other Mining and Well Construction	0.001	0.022	0.001	0.034	0.2%	0.6%
341	Engine, Turbine, and Power Transmission Equipment	0.001	0.021	0.001	0.021	0.9%	2.3%
132	Industrial Nonbuilding Structures	0.001	0.016	0.002	0.040	0.5%	1.3%
203	Religious Buildings	0.000	0.013	0.000	0.021	0.1%	0.2%
221	Conservation and Control Structures	0.000	0.004	0.000	0.011	0.2%	0.5%
204	Public Safety Buildings	0.000	0.006	0.000	0.007	--	--
211	Mine Shafts	0.000	0.005	0.000	0.008	0.1%	0.1%
345	Floating Oil and Gas Drilling and Production Platforms	0.000	0.002	0.000	0.003	0.1%	0.2%
346	Nuclear Fuel	0.000	0.001	0.000	0.001	0.1%	0.2%

Note: Total number of sample firms is 27,712. Of these, 21,686 had non-zero equipment investment and 10,782 had non-zero structures investment. Weights used in means are inverse sampling probabilities.

1. The full name of this category is "Ventilation, Heating, Air-Conditioning, Commercial Refrigeration, and Other General Purpose Machinery"

Table 2. Concentration of Type-Specific Investment among Industries

Asset Type Code	Description	Top 4 Industries' Concentration Ratio
	Equipment	
311	Computer and Peripheral Equipment	0.2412
316	Capitalized Software Purchased Separately	0.2595
312	Office Equipment Except Computers and Peripherals	0.2794
324	Ventilation, Heating, Air-Conditioning, Commercial Refrigeration, and Other General Purpose Machinery	0.3187
351	Furniture and Related Products	0.3757
323	Special Industrial Machinery	0.3847
361	Artwork, Books, and Other Equipment, NEC	0.3922
321	Fabricated Metal Products	0.4234
355	Other Miscellaneous Equipment	0.4487
314	Navigational, Measuring, Electromedical, and Control Instruments	0.4512
334	Other Transportation Equipment	0.5213
354	Service Industry Equipment	0.5284
352	Agricultural Equipment	0.5782
332	Heavy Duty Trucks	0.5976
353	Construction Machinery	0.6677
343	Electrical Equipment, NEC	0.6697
344	Mining and Oil and Gas Field Machinery and Equipment	0.7137
322	Metalworking Machinery	0.7280
315	Medical Equipment and Supplies	0.7859
331	Cars and Light Trucks	0.8331
333	Aerospace Products and Parts	0.8570
313	Communications, Audio, and Video Equipment	0.8699
342	Electrical Transmission and Distribution Equipment	0.8993
341	Engine, Turbine, and Power Transmission Equipment	0.9150
345	Floating Oil and Gas Drilling and Production Platforms	0.9915
Median (all equipment types)		**0.5782**

	Structures	
131	Manufacturing, Processing, and Assembly Plants	0.2738
154	Warehouses and Distribution Centers (except Passenger)	0.3571
141	Office, Bank, and Professional Buildings	0.4352
223	Other Non-building Structures, NEC	0.5100
222	Highway and Street Structures	0.5966
221	Conservation and Control Structures	0.7069
155	Other Commercial Stores/Buildings, NEC	0.7191
212	Petroleum and Natural Gas Wells	0.7358
151	Automotive Facilities	0.7908
132	Industrial Nonbuilding Structures	0.8032
111	Residential Structures	0.8067
171	Amusement and Recreational Facilities	0.8290
213	Other Mining and Well Construction	0.8654
211	Mine Shafts	0.8705
192	Electric, Nuclear, and Other Power Facilities	0.8732
202	Special School and Other Educational Facilities	0.9028
181	Air, Land, and Water Transportation Facilities	0.9106
121	Hotels, Motels, and Inns	0.9114
201	Preschool, Primary/Secondary, and Higher Education Facilities	0.9206
142	Medical Offices	0.9242
153	Multi-Retail Stores	0.9286
193	Water Supply, Sewage, and Waste Disposal Facilities	0.9325
112	Manufactured (Mobile) Homes	0.9353
152	Stores - Food Related	0.9498
162	Special Care Facilities	0.9653
161	Hospitals	0.9894
203	Religious Buildings	0.9897
191	Telecommunication Facilities	0.9925
204	Public Safety Buildings	0.9995
Median (all structure types)		**0.8732**

TABLE 3. Partial correlations between Computer investment share and each other type's investment share (Sorted by correlation. Only those with correlations significant above the 99% level are shown. Correlations control for 3-digit industry dummies)

Asset Type Code	Description	Correlation
141	Office, Bank, and Professional Buildings	0.248
314	Navigational, Measuring, Electromedical, and Control Instruments	0.214
351	Furniture and Related Products	0.104
312	Office Equipment Except Computers and Peripherals	0.086
316	Capitalized Software Purchased Separately	0.083
155	Other Commercial Stores/Buildings, NEC	0.072
153	Multi-Retail Stores	0.060
333	Aerospace Products and Parts	0.039
361	Artwork, Books, and Other Equipment, NEC	0.030
313	Communications, Audio, and Video Equipment	-0.019
344	Mining and Oil and Gas Field Machinery and Equipment	-0.020
332	Heavy Duty Trucks	-0.022
355	Other Miscellaneous Equipment	-0.024
346	Nuclear Fuel	-0.025
213	Other Mining and Well Construction	-0.026
342	Electrical Transmission and Distribution Equipment	-0.028
341	Engine, Turbine, and Power Transmission Equipment	-0.028
323	Special Industrial Machinery	-0.028
132	Industrial Nonbuilding Structures	-0.034
151	Automotive Facilities	-0.035
181	Air, Land, and Water Transportation Facilities	-0.041
192	Electric, Nuclear, and Other Power Facilities	-0.045
322	Metalworking Machinery	-0.050
212	Petroleum and Natural Gas Wells	-0.057
191	Telecommunication Facilities	-0.070
331	Cars and Light Trucks	-0.242

Table 4. Variety of Investment by Firm Size

Decile (Sales)	3+ Equipment Share	Mean Number of Equipment Types	3+ Structures Share	Mean Number of Structure Types
1	24.5	2.07	4.4	1.23
2	28.1	2.02	5.0	1.25
3	45.0	2.66	7.3	1.33
4	54.4	3.15	7.0	1.34
5	60.1	3.55	8.5	1.41
6	61.5	3.66	9.6	1.43
7	65.1	3.97	12.7	1.54
8	68.5	4.15	14.0	1.57
9	68.8	4.21	17.1	1.70
10	70.5	4.76	25.4	2.06

Notes: The 3+ equipment (structures) share is the proportion of the sample that invested in 3 or more types of equipment (structures), conditional on having non-zero equipment (structures) investment.